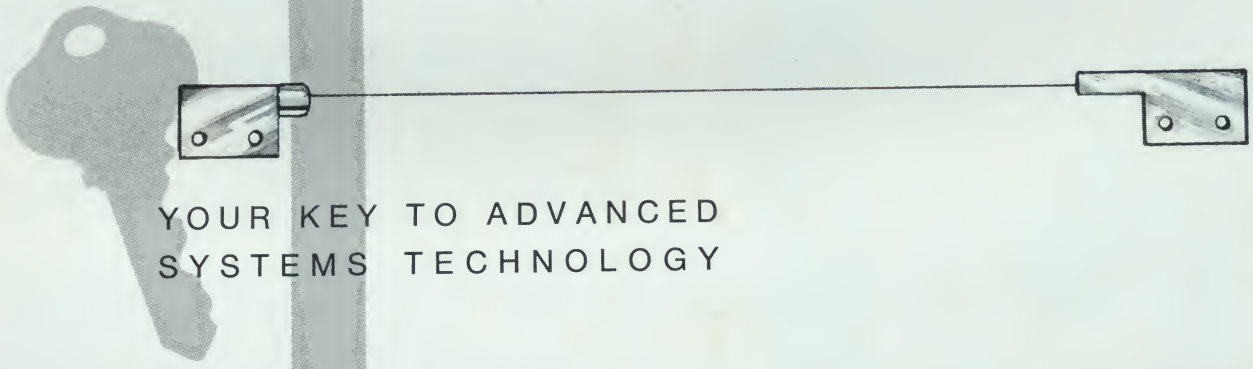
Bulletin No. 6601

Mr. T.H. Nelson
Box 1546
Poughkeepsie, N.Y. 12603

AUTOMATION CONTROL DEVICES



YOUR KEY TO ADVANCED
SYSTEMS TECHNOLOGY

SKAN

DIVISION of

frost CONTROLS CORP.

SKANEATELES, N. Y.

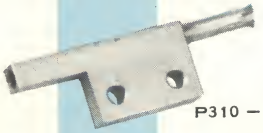
TELEPHONE: 315-685-3473

HAVE A SPACE PROBLEM? GO SUBMINIATURE!

PHOTOS ACTUAL SIZE

For applications requiring highest speed of response, high shock and vibration capability, extreme temperatures, and extremely fine resolution, we offer the smallest receivers, light sources and reflex scanners commercially available. Applications involving resolution to .005" are now made practical with standard controls.

TYPICAL USES: AUTOMATIC ASSEMBLY AND INSPECTION • PRECISE CUT-OFF CONTROL • REGISTRATION • COUNTING • PROXMITY CONTROL



P310 — P311

P320 P321

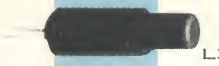
P330 P331

P340 P341
L351

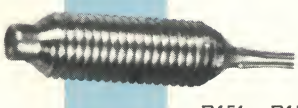
S310 S311
S312 S313

L311

L321 L332



L341



P151 P152

SUBMINIATURE PHOTOHEADS

P300 and S300 SERIES subminiature photoheads utilize the IN2175 silicon light sensor. This sensor, with an integral lens, is recessed slightly in the housing to exclude random light. Models designed for reflected light applications, such as S310 and S312, contain a light source as well as a sensor. Most models are waterproof (submersible). Specifications and operating curves are shown below, dimensions on pages 6 and 7. Teflon* ribbon cable is furnished in 4 foot length unless otherwise specified on your order. P300 and S300 series photoheads match with any R300, T300, or C300 series control. For example, T310B. See pages 4 thru 7 for controls. These photoheads can also be furnished on special order with LS-400, H-35, and other sensors of same size as IN2175.

NOTE: Shielded leads on sensor required for impulse operated control Type R356.

P310 and P311 RECEIVERS for direct or reflected light applications using a separate light source. Furnished with mounting screws. P311 has shielded leads.

P320 and P321 RECEIVERS for direct or reflected light applications using a separate light source. Threaded body mounts in a tapped hole or thru sheet metal with a nut on each side. P321 has shielded leads.

P330 and P331 RECEIVERS for direct light applications using a separate light source. Lens of sensor is recessed ¼ inch in the barrel to exclude random light. Threaded body mounts in an 8-32 tapped hole or thru sheet metal with a nut on each side. P331 has shielded leads.

P340 and P341 RECEIVERS for direct or reflected light applications using a separate light source. Mounting tab can be bent for alignment. P341 has shielded leads.

S310 and S311 SCANNERS contain a subminiature lamp as well as the light sensor for operation by reflected light from most surfaces. Lamp rating 5.0 volts, 0.115 amp. Nominal distance between scanner and surface, ⅛" to ¾". For detecting very small flaws, marks or objects, S310 is the best. For longer range on larger surfaces, use S312 or S313. S311 has shielded sensor leads.

S312 and S313 SCANNERS contain a subminiature lamp and a collimating lens as well as the light sensor for operation by reflected light from most surfaces. The lens produces a narrow intense beam for longer operating range. Nominal distance between scanner and surface, ½" to 2". S313 has shielded sensor leads.

*DU PONT TRADEMARK

SUBMINIATURE LIGHT SOURCES

L300 SERIES subminiature light sources use the #715 lamp which operates on 5 volts, 0.115 amp.
Average lamp life is 40,000 hours at 5.0 volts. This lamp is made with wire leads only and is not removable. All models have optical lenses and most models are waterproof (submersible). Proper lamp voltage is provided by size 3, 4 and 5 controls. Size 0, 1, and 2 controls require a separate filament power source. Teflon* ribbon leads are furnished in 4 foot length unless otherwise specified on your order.

L311 has a collimating lens of ⅛" diameter producing a slightly diverging beam in the shape of the enlarged filament image.

L321 has collimating lens of 4mm diameter producing a clearly defined beam of smaller cross-section and less divergence than the L311.

L332 has a double-convex lens of short focal length producing the filament image in actual size at a distance of approximately ⅜" from the lens or forward end of the housing.

L341 has identical lamp, lens, and performance to the L321 above. ¼-28 threaded housing.

L351 has a 4mm lens with identical performance to L321 and L341. Mounting-tab can be bent for beam alignment.

L361 is for short range (1½" max.) operation. Contains no lens. Housing is 10-32 threaded body.

OPERATING RANGES (inches)

L311	0-8	With P300 series receivers and T300 series drivers or R350 series controls.
L321	0-15	
L332	0-2	
L341	0-15	
L351	0-15	
L361	0-1½	
S310, S311	⅛-¾	With T300 series Drivers or R350 series controls.
S312, S313	⅜-2	

PHOTOCELL RATINGS & SPECIFICATIONS

	IN2175	CL603A
Max. Bias Voltage @ 25° C	50	300
Max. Power Dissipation @ 25° C	250 MW	75 MW
Max. Operating Temperature	125° C	75° C
Typical Dark Current @ 25° C @ 50 VDC	.01 Microamp	.01 Microamp
Typical Dark Current @ 100° C	20 Microamps	—
Typical Light Current @ 25° C @ 10 VDC	200 Microamps*	133 Microamps**
Typical Photocurrent Rise Time	2 Microseconds	2 Milliseconds
Typical Photocurrent Fall Time	45 Microseconds	2 Milliseconds
Typical Sensitivity	22.3 Microamps/ mw/cm2	—

For detailed photocell specifications refer to manufacturers' bulletins.
*IRRADIANCE = 9 mw/cm2 wave length .7 to 1.1 microns. **AT 2 fc, tungsten filament.

LAMP RATINGS & SPECIFICATIONS

	L100 & S100 SERIES #12 LAMP	L300 & S300 SERIES #715 LAMP
DESIGN VOLTS	6.3	5.0
DESIGN AMPS	0.18	0.115
AVERAGE LIFE	5,000 HRS.	40,000 HRS.

SHOCK & VIBRATION DATA L300, P300, & S300 SERIES

SHOCK, 10 MS duration: 100G
VIBRATION: 55-2000 CPS, 2 min.—40 G
5-55 CPS, 3 min.—.24 in. DA
ACCELERATION: 300 G

STANDARD SIZE PHOTOHEADS

For general purpose applications on conveyors and automatic machinery where high reliability and long life is imperative.

P100 Series Receivers and S100 Series Scanners utilize the CL603A cadmium selenide photocell sealed in glass for lifetime operation. All photoheads have optical lenses and an aperture at the focal point to provide a narrow field of view. Specifications are shown on pages 2 and 3, dimensions on pages 6 and 7. Wire leads are furnished in 8 foot length unless otherwise specified on your order. 100 series photoheads and scanners match with any R100, T100, or C100 series control device. For example, R150A. See pages 4 thru 7 for controls.

L100 Series Light Sources utilize the #12 bi-pin lamp rated 5000 hours at 6.3 volts, 0.18 amp. Lens barrel has an optical lens and is removable by loosening a set screw.

Light Sources and Receivers with identical numbers are dimensionally identical. For example, P130 Receiver has the same dimensions as L130 Light Source. See pages 6 and 7.

P110, L110: 5/8" Lens Barrel, with male thread for 1/4" pipe, two 6-32 tapped mounting holes. #18 wire leads.

P120, L120: Waterproof, have threaded barrels with "O" rings. Male thread for 1/4" pipe, two 6-32 tapped mounting holes. #18 wire leads.

P130, L130: 5/8" Lens Barrel. Mount with two 6-32 screws (clearance holes). Head can be rotated for alignment by loosening a set screw. 18-2 grey SV cord.

P131, L131: 5/8" Lens Barrel. Mount with two 6-32 screws (clearance holes). Head can be rotated for alignment by loosening a set screw. Leads in 5/16" O.D. extra flexible armor.

P140, L140: 1 1/16" Lens Barrels for longer range. Mount with two 6-32 screws (clearance holes). Head can be rotated for alignment by loosening a set screw. 18-2 grey SV cord.

P141, L141: 1 1/16" Lens Barrel for longer range. Head can be rotated for alignment by loosening a set screw. Leads in 5/16" O.D. extra flexible armor.

P150, L150: 5/8" Lens Barrel. 3/8-18 threaded mounting stub. #18 wire leads.

P151: 5/16-24 threaded body with 4MM lens. #24 wire leads.

S116: Reflex Scanner, contains both lamp (#12, 6 volt) and photocell with optical lenses. Adjustable angle on both light source and receiver. Leads in 5/16" O.D. extra flexible armor.

S117: Reflex Scanner, contains both lamp (#715, 5 volt) and photocell. No lenses. 5/8-18 threaded body with two hex nuts for mounting. Ribbon cable leads.

S118: Reflex Scanner, contains both lamp (#715, 5 volt) and photocell. No lenses. Rectangular body has two mounting holes for #4 screw.

OPERATING RANGES FOR SERIES L100, P100, S100 PHOTOHEADS USING SERIES C100, R100, T100 CONTROLS

LIGHT SOURCE	RECEIVER	MAX. RANGE IN FEET
L110	P110	4
L120	L120	2*
L130	L130	4
L131	L131	4
L140	L140	6
L141	L141	6
L150	P150	4
ANY	P151	1 1/2

REFLEX SCANNERS	RANGE (INCHES)
S116	3/8 to 1 1/2 ADJ
S117	1" MAX.
S118	1" MAX.

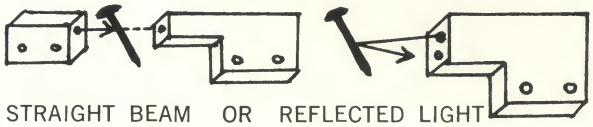
*WATERPROOF UNITS—Derated from 4 feet due to light loss with wet lenses.

HOW TO ORDER

SKAN DIVISION OF

P.O. BOX 68 frost CONTROLS CORP SKANEATELES, N.Y.

1. Select Photocell and Light Source combination to fit your requirements:

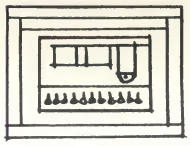


STRAIGHT BEAM OR REFLECTED LIGHT

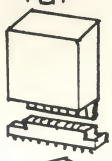
2. Choose a Control to match Photocell type and your operating requirements: (see pages 4 and 5 for details)

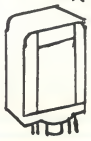
Size 1 Relay requires separate lamp filament transformer, but includes relay.

Size 3 Relay is complete package, has lamp filament transformer and relay.

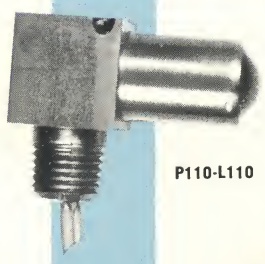


Size 5 Control is complete package with plug-in driver, relay, lamp voltage selector and terminal strip.

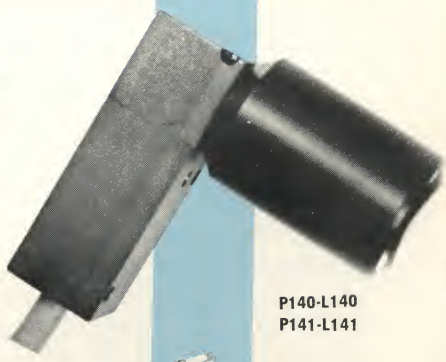




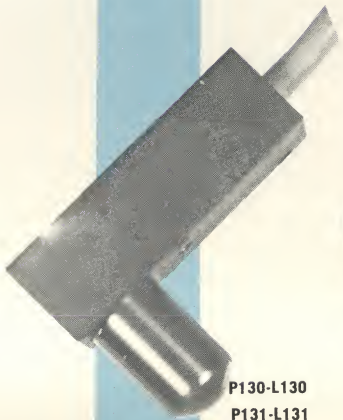
Size 0 and Size 1 Drivers provide a DC power output to your load, require separate lamp filament transformer.



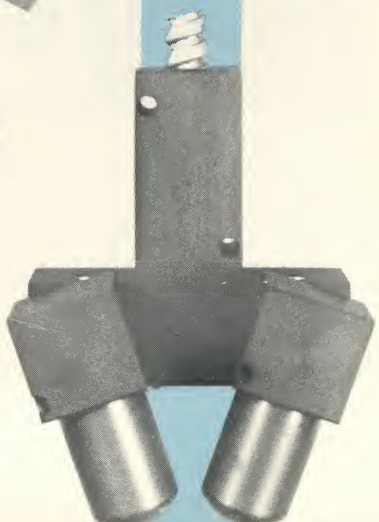
P110-L110



P140-L140
P141-L141



P130-L130
P131-L131



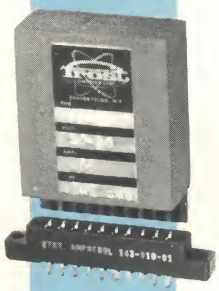
S116

SMALL PLUG-IN PHOTOELECTRIC RELAYS

Compact units contain 115 to 24 volt step-down transformer, transistor amplifier and relay for fast switching applications. Use with remote photocell. Series R110 designed for use with type 1 standard size photocell, series R310 for type 3 subminiature photocell. Standard octal plug.

HEAVY DUTY PLUG-IN PHOTOELECTRIC RELAYS

For heavy duty use, these units contain a 115 to 26.5/6.3 volt transformer, transistor amplifier, and 10 amp relay. Model R130A for fast switching using remote type 1 standard size photocell, model R330A for fast switching with type 3 subminiature cell. Models R135A & B (std. cell), R335 A & B (submin. cell), have adjustable timing circuits. Output for lamp filament, 6.3 volts @ 0.6 amp. Models R330A, R334 A & B furnished with dropping resistor for 5 volt miniature lamps. Standard 11-pin plug.

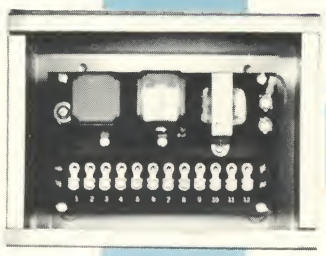


SOLID STATE DRIVER PRINTED CIRCUIT CARDS

Encapsulated driver circuits with .156" contact spacing, furnished with Amphenol 143-010-01 P.C. connector, for operation from remote photocells. T100 series for use with type 1 (CL603A or equal) cell, T300 series for use with type 3 (IN2175 or equal) cell. Potentiometers furnished with adjustable sensitivity and adjustable delay types. All units contain a full wave rectifier and filter. Input power 24-28 volts, AC or DC. On-off type output, 0-28 VDC, suitable for operating 24 VDC relays, solenoids, counters.

SOLID STATE DRIVER PLUG-IN MODULES

Driver circuits same as P.C. cards above, but encapsulated in small relay cases with standard octal plugs.

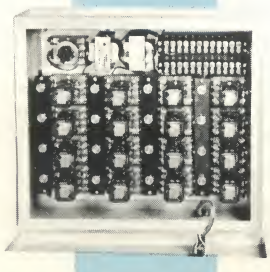


INDUSTRIAL TYPE PHOTOELECTRIC CONTROLS

Packaged controls for industrial applications, consisting of panel with plug-in driver module, plug-in DPDT 10 amp relay, 115 or 230 to 26.5/6.3 volt transformer, sensitivity and/or time delay adjustment, and terminal strip in a NEMA 1 enclosure. Lamp voltage selector for 5 or 6 volt lamps. R150 series designed for type 1 standard size photoheads, R350 series for type 3 subminiature photoheads.

PHOTOELECTRIC COUNTERS

Totalizing counters for operation from remote photocells. Counter unit contains 115 to 26.5/6.3 volt transformer, plug-in driver module, screw terminals, and plug-in 6-digit pushbutton-reset counter. Type C140A for use with type 1 standard size photoheads, C340A for use with type 3 subminiature photoheads. Maximum counting rate, 25 per second. Mechanical life, 100 million operations.



SPECIAL PURPOSE CONTROLS

Many applications involve a number of interwired control modules and/or modification of standard control items. We have had considerable experience in the design and manufacture of control panels for automatic parts assembly, inspection, counting, sorting, and wrapping. Please submit your requirements for quotation.

SK

D1

SKAN

P

	TYPE	T
SMALL PLUG-IN PHOTOELECTRIC RELAYS	R110A R110B R110C R110D R310A R310B	
HEAVY DUTY PLUG-IN PHOTOELECTRIC RELAYS	R130A R135A R135B R330A R335A R335B	
SOLID STATE DRIVER P.C. CARDS	T100A T100B T105A T105B T105C T300A T300B T300C T305A T305B T305C	
SOLID STATE DRIVER PLUG-IN MODULES	T110A T110B T115A T115B T115C T310A T310B T310C T315A T315B T315C	
INDUSTRIAL TYPE PHOTOELECTRIC CONTROLS	R150A R150B R155A R155B R155C R156A R350A R350B R355A R355B R355C R356A	
PHOTOELECTRIC COUNTERS	C140A C340A	

NOTES

① Refers to relay positin (i external load (solid stat ty control may be connected fo energization.

② **RESPONSE TIME**—Ris or rise or fall time of transist time for relay types).

③ **TIME DELAY MODES:** Spec X, Y modes: .05-1 sec., 0.1-5 s

W—Relay or load is de-ene photocell. Cell must remain period (adjustable) befor re Relay or load will then rema is again illuminated. Light on or load and resets timing mentary illuminating of cel (dark) period resets timing to

IVISION OF

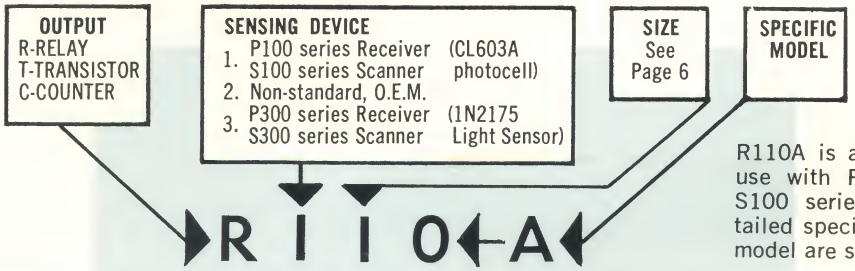
frost CONTROLS CORP

ANEATELES, N. Y.

P.O. BOX 68

HOW TO ORDER

1. Select most suitable Receiver or Scanner from pages 2 and 3.
2. Select most suitable Light Source from pages 2 and 3. (Scanners contain both receiver and Light Source.)
3. If P100 series Receiver or S100 series Scanner is selected, choose R100 series Relay, T100 series Driver, or C140 A Counter.
4. If P300 series Receiver or S300 series Scanner is selected, choose R300 series Relay, T300 series Driver, or C340A Counter.



R110A is a Photoelectric Relay for use with P100 series Receiver or S100 series Scanner, Size 1. Detailed specifications on this specific model are shown in the chart.

① RELAY/LOAD ENERGIZED WITH PHOTOCELL Light	Dark	Either	② RESPONSE TIME	③ TIME DELAY MODE	MAXIMUM OPERATIONS PER SECOND	④ SENSITIVITY CONTROL	⑤ RELAY CONTACTS	⑥ MAXIMUM DRIVER OUTPUT (ma.)	⑦ LAMP FILAMENT POWER	⑧ INPUT POWER (STANDARD)	WIRING CONNECTIONS	⑨ SPECIAL FEATURES	SIZE FIG. NO.
	X					EXT. ADJ.	SPDT-3A	10 ma. @ 24V DC	NONE				
X						EXT. ADJ.	SPDT-3A	10 ma. @ 24V DC	NONE				
	X		20 msec.	None	25	FIXED	SPDT-3A	10 ma. @ 24V DC	NONE	SPECIFY		VERY LOW	
X						FIXED	SPDT-3A	10 ma. @ 24V DC	NONE	115V AC	OCTAL PLUG	CURRENT	1
		X				FIXED	SPDT-3A	10 ma. @ 24V DC	NONE	48V DC		DRAIN	
		X				EXT. ADJ.	SPDT-3A	10 ma. @ 24V DC	NONE	24-28V AC/DC		3 ma. @ 115V AC	
	X		20 msec.	None	25	FIXED	SPDT-10A	120 @ 24V DC	6.5V 6A				
	X		adj.	W	10	FIXED	SPDT-10A	120 @ 24V DC	6.5V 6A				
X			adj.	X	10	FIXED	SPDT-10A	120 @ 24V DC	6.5V 6A	SPECIFY			
		X	20 msec.	None	25	EXT. ADJ.	SPDT-10A	120 @ 24V DC	5V 115A	230V AC	11-PIN PLUG		3
	X		Variable	W	10	FIXED	SPDT-10A	120 @ 24V DC	5V 115A	115V AC			
X			Variable	X	10	FIXED	SPDT-10A	120 @ 24V DC	5V 115A	24-28V AC/DC			
	X		2 msec.	None	250	FIXED	NONE	120 @ 24V DC	NONE				
X			2 msec.	None	250	FIXED	NONE	120 @ 24V DC	NONE				
	X		adj.	W	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	X	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	Y	10	FIXED	NONE	120 @ 24V DC	NONE				
	X		.05 msec.	None	10 KC	EXT. ADJ.	NONE	120 @ 24V DC	NONE				
		X	.05 msec.	None	10 KC	EXT. ADJ.	NONE	120 @ 24V DC	NONE	12-30 VOLTS AC/DC	P.C. CONNECTOR	WITHSTAND HIGH SHOCK & VIBRATION 100 G. SHOCK 300 G. ACCELERATION 40 G. 55-2000 CPS	0
		X	.05 msec.	None	10 KC	EXT. ADJ.	NONE	120 @ 24V DC	NONE				
	X		adj.	W	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	X	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	Y	10	FIXED	NONE	120 @ 24V DC	NONE				
	X		2 msec.	None	250	FIXED	NONE	120 @ 24V DC	NONE				
X			2 msec.	None	250	FIXED	NONE	120 @ 24V DC	NONE				
	X		adj.	W	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	X	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	Y	10	FIXED	NONE	120 @ 24V DC	NONE				
	X		.05 msec.	None	10 KC	EXT. ADJ.	NONE	120 @ 24V DC	NONE				
		X	.05 msec.	None	10 KC	EXT. ADJ.	NONE	120 @ 24V DC	NONE	12-30 VOLTS AC/DC	OCTAL PLUG	WITHSTAND HIGH SHOCK & VIBRATION 100 G SHOCK 300 G. ACCELERATION 40 G. 55-2000 CPS	1
	X		.05 msec.	None	10 KC	EXT. ADJ.	NONE	120 @ 24V DC	NONE				
		X	.05 msec.	None	10 KC	EXT. ADJ.	NONE	750 @ 24V DC	NONE				
	X		adj.	W	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	X	10	FIXED	NONE	120 @ 24V DC	NONE				
X			adj.	Y	10	FIXED	NONE	120 @ 24V DC	NONE				
	X		20 msec.	None	25	FIXED	DPDT-10A	120 @ 24V DC	5V/6.5V				
X			20 msec.	None	25	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
	X		adj.	W	10	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
X			adj.	X	10	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
X			adj.	Y	10	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
		X	0.5 msec.	Z	20	INT. ADJ.	SPDT-10A	120 @ 24V DC	.6A MAX	SPECIFY			
			20 msec.	None	25	INT. ADJ.	DPDT-10A	120 @ 24V DC	.6A MAX	230V AC	SCREW TERM.		5
	X		20 msec.	None	25	INT. ADJ.	DPDT-10A	120 @ 24V DC	.6A MAX	115V AC			
			adj.	W	10	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
X			adj.	X	10	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
X			adj.	Y	10	FIXED	DPDT-10A	120 @ 24V DC	.6A MAX				
		X	0.5 msec.	Z	20	INT. ADJ.	SPDT-2A	120 @ 24V DC	.6A MAX				
		X	20 msec.	None	25	INT. ADJ.	NONE	120 @ 24V DC	.6A MAX	115V AC	SCREW TERM.		4
		X	20 msec.	None	25	INT. ADJ.	NONE	120 @ 24V DC	.6A MAX				

TES:

on (integral relay types) or e types). "EITHER" means ed for either light or dark

e or fall time of cell + nsistors (+ relay operate

(Specify delay range for W, 1-5 sec., 0.5-12 sec.).

e-energized with light on main dark for the timed e relay or load energizes. remain energized until cell t on cell de-energizes relay ing circuit instantly. Mo- cell during the timing g to zero.

X—Relay or load is de-energized with photocell dark. Cell must remain illuminated for the timed period (adjustable) before relay or load energizes. Relay or load will then remain energized until cell is again darkened. Darkened cell de-energizes relay or load and resets timing circuit instantly. Momentary darkening of cell during the timing (light) period resets timing to zero.

Y—Relay or load is energized with the photocell illuminated. Cell must remain dark for the timed period (adjustable) before relay or load de-energizes. Relay or load will then remain de-energized until cell is again illuminated. Light on cell energizes relay or load and resets timing circuit instantly. Momentary illumination of cell during the timing (dark) period resets timing to zero.

Z—This control contains a pulse-stretching circuit, allowing relay operation from an impulse as short as .0005 second. The impulse is obtained by an abrupt change of light intensity on the photocell. A selector switch is provided to select operation from either light increase or light decrease. Sensitivity is adjustable, allowing operation from a small change in photocell illumination, or operation from only a large change in illumination excluding operation from minor changes. The impulse from the photocell energizes the relay, which then remains energized for approximately 0.12 second, then re-sets automatically. This feature allows time for operation of external loads. The relay can also be made to hold in until re-set by an external switch or relay connected to terminals provided for this purpose. All impulse operated controls require shielding on the photocell leads. See pages 2 and 3.

④ **SENSITIVITY CONTROL:**
EXT. ADJ. = Adjustable by means of an external potentiometer furnished with control.
FIXED = Sensitivity fixed at optimum point.
INT. ADJ. = Adjustable with an internal potentiometer.

⑤ **RELAY CONTACTS:** Contact ratings are for non-inductive load @ 115 VAC. SPDT = 1 form C = single pole double throw. DPDT=2 form C=double pole double throw. Solid state units provide a DC power output rather than contact closure.

⑥ **MAXIMUM DRIVER OUTPUT (MA):** Maximum current rating in milliamps of the driver circuit. This rating is given for relay types as well as for solid state types in the event the engineer wishes to either substitute another relay for that furnished or disconnect the relay coil and drive his load directly from the driver circuit.

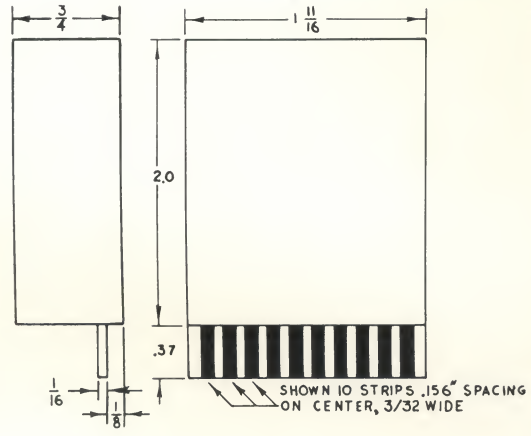
⑦ **LAMP FILAMENT POWER:** Size 3, 4 and 5 relays, counters and controls contain a low-voltage supply for the light source. Size 0, 1, and 2 units require a separate supply for the light source.

⑧ **INPUT POWER (STANDARD):** Other voltages available on special order.

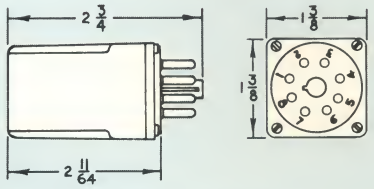
⑨ **SPECIAL FEATURES:** Detailed shock and vibration specifications available on request.

MAXIMUM AMBIENT TEMPERATURE — 140° F

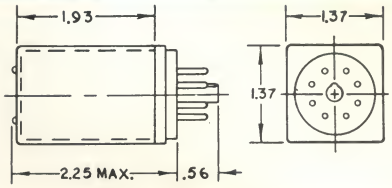
DIMENSIONAL DRAWINGS



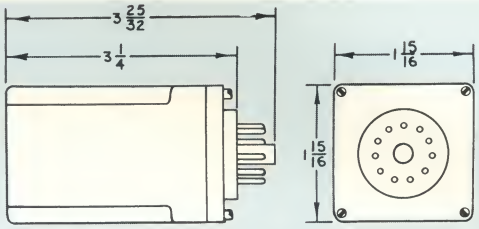
SIZE 0 P.C. CARD



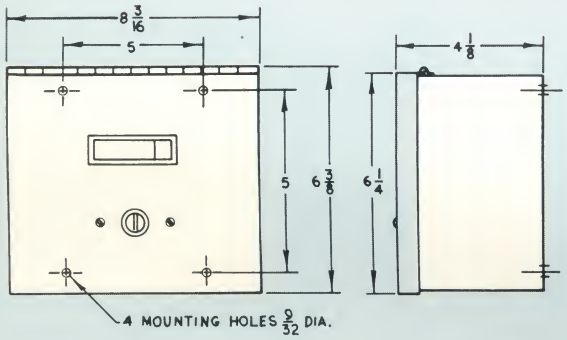
SIZE 1 DRIVER



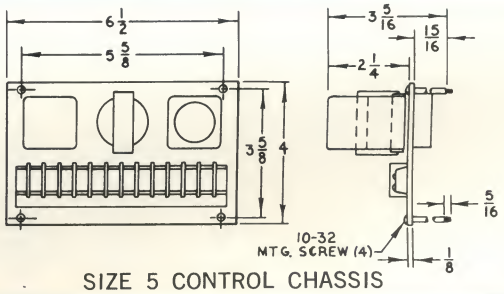
SIZE 1 RELAY



SIZE 3 RELAY

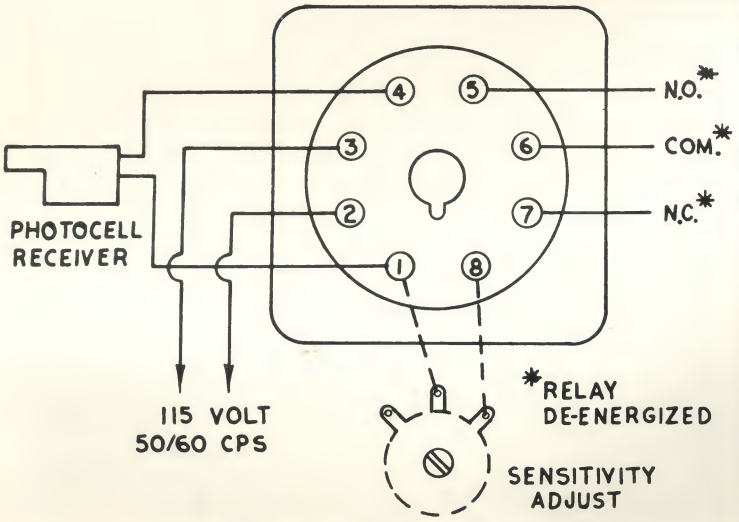


SIZE 5 CONTROL ENCLOSURE

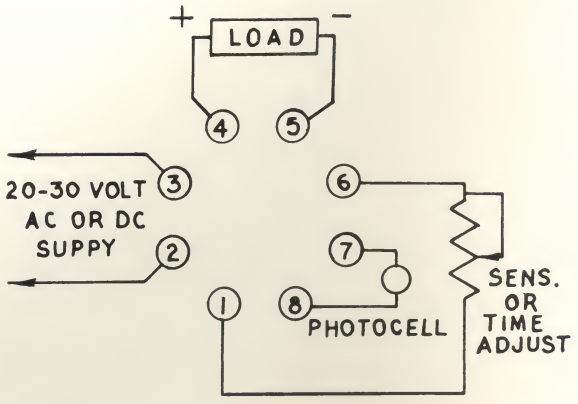


SIZE 5 CONTROL CHASSIS

INSTALLATION DIAGRAMS

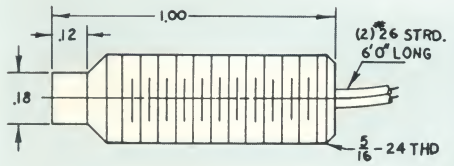


R110 & R310 SERIES RELAYS

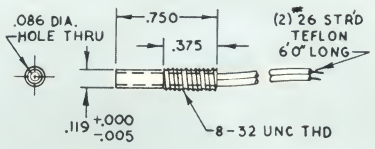


T100 & T300 SERIES DRIVERS

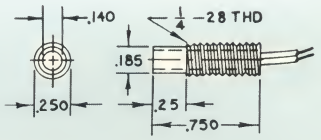
REFER TO DETAILED INSTALLATION INSTRUCTIONS FOR EACH MODEL



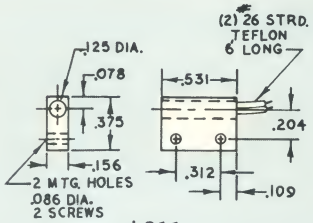
P151



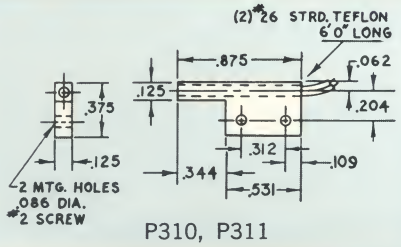
P320, P321



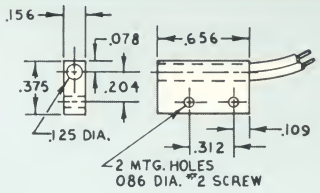
L341



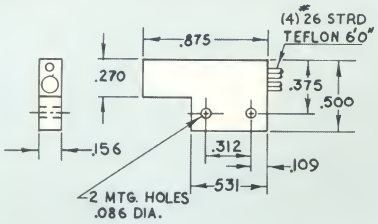
L311



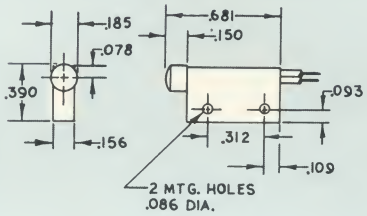
P310, P311



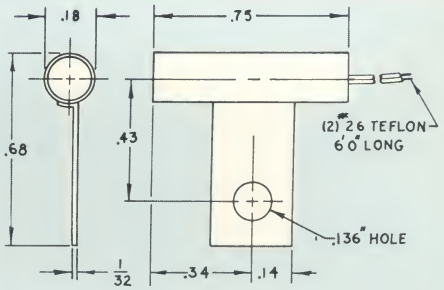
L332



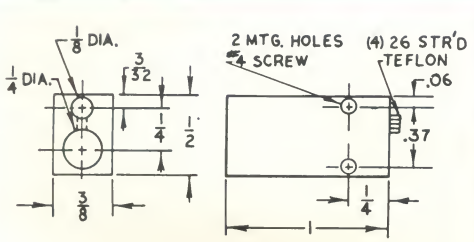
S310, S311, S312, S313



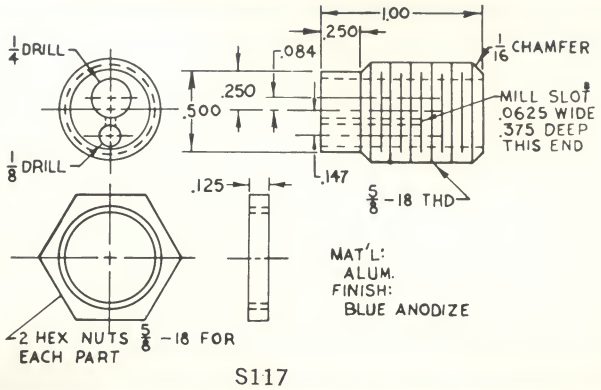
L321



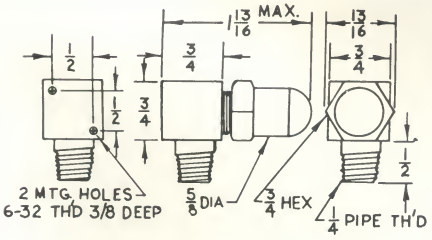
L351, P340, P341



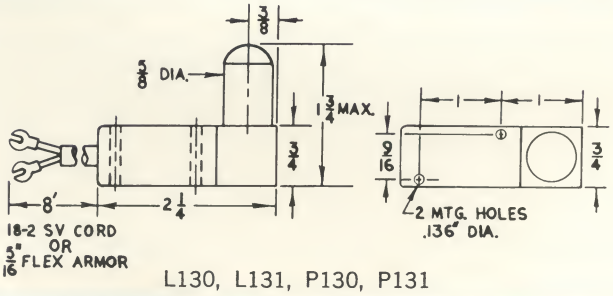
S118



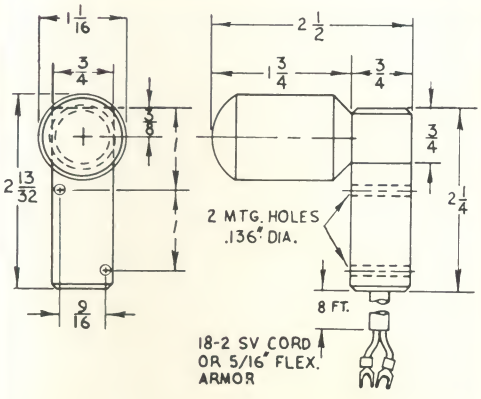
S117



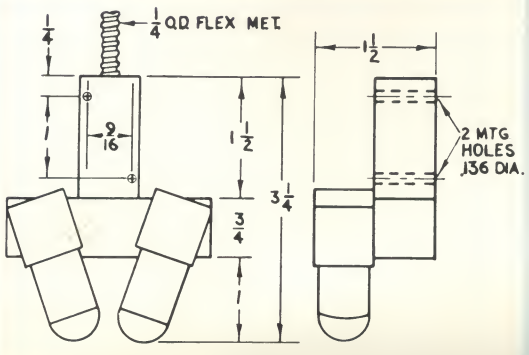
L120, P120



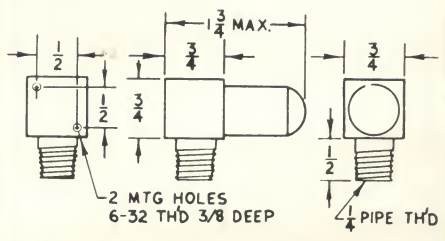
L130, L131, P130, P131



L140, L141, P140, P141



S116



L110, P110

SKAN

DIVISION OF

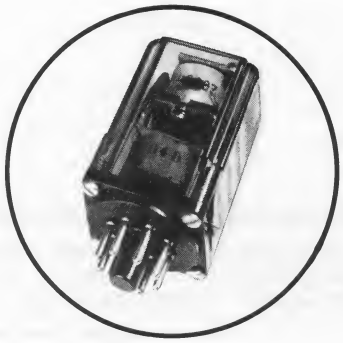
P.O. BOX 68

SKANEATELES, N.Y. 13152

PRINTED IN U.S.A.

frost CONTROLS CORP.

ULTRA-SENSITIVE
ELECTRONIC PILOT RELAYS



ALL IN ONE SMALL RELAY CASE:

1. 115 to 24 Volt Transformer
2. Full-Wave Rectifier
3. High Gain Amplifier
4. SPDT or DPDT Relay
5. Maximum Performance

ALL SILICON SEMICONDUCTORS FOR OPERATION IN HIGH TEMPERATURES

APPLICATIONS

EDGE OR LIMIT CONTROL: Position or size of conductive material can be controlled within a few thousandths of an inch by very light contact with a cat's whisker type probe.

LIQUID LEVEL CONTROL: Levels in slightly conductive liquids may be accurately controlled using probe rods or wires which contact the surface of the liquid at the desired levels. Used for high or low level cut-off, high or low level alarm, maintaining a level between high and low points, metering, and foam control.

FLOW CONTROL: Model R015 Pilot Relay is used in many can plants to detect interruption of a stream of molten resin injected into the seam of the can. The fine stream of resin completes the probe circuit between the nozzle and the forming machine. Interruption of the stream causes the relay to energize, shutting down the machine.

METER RELAY SUBSTITUTE: R01 Series Pilot Relays are far more rugged and dependable, are smaller and less expensive than meter relays, for which they may be substituted in many applications. Shorting the signal input circuit can cause no damage.

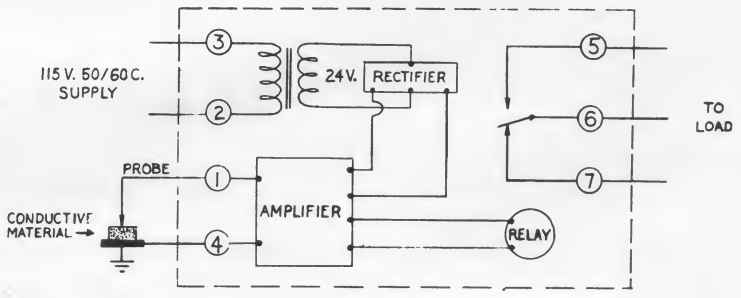
PHOTOELECTRIC CONTROL: See Bulletin 6601 for models designed for photocell input.

GENERAL DESCRIPTION

The Series R01 Pilot Relay is a small plug-in module containing a 115 to 24 volt step-down transformer, full wave bridge rectifier, and a high gain amplifier driving an internal relay. Input power is 115 volts 50/60 cycle, 1/4 watt. (24 VAC, 24 VDC, & 48 VDC models available.)

A change of resistance in, or opening and shorting, the probe circuit causes the relay to transfer. Limiting resistors in the module allow the probe circuit to be short-circuited without damage, regardless of sensitivity setting. Probe current is negligible; probe leads can be any length and any practical size.

TYPICAL CIRCUIT



SPECIFICATIONS

ALL MODELS

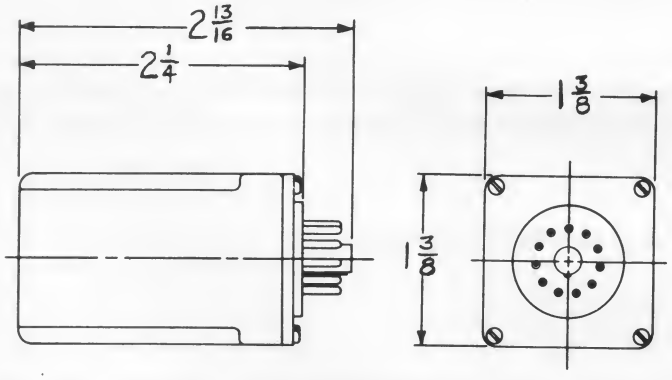
RELAY CONTACT RATING:	3.5 AMPS @ 115 VAC, non-inductive load
MAX. PROBE VOLTAGE:	26.5
* MAX. OPERATE SPEED:	20 CPS
MAX. AMBIENT TEMPERATURE:	175° F
MAX. POWER REQUIRED (RELAY ENERGIZED)	115 V. 50/60 cy., 290 MW.
SIZE:	1-3/8 x 1-3/8 x 2-13/16
WEIGHT:	3.8 oz.

* Cycling speed decreases as probe circuit resistance increases.

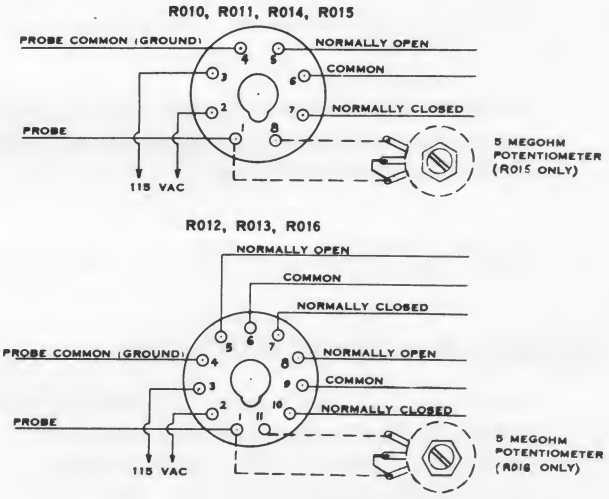
MODEL NO.	RELAY CONTACTS	PLUG	SENSITIVITY	MAX. EXTERNAL PROBE CIRCUIT RESISTANCE†	MAX. PROBE CURRENT (SHORT CIRCUITED)	RELAY POSITION WITH PROBE CIRCUIT OPEN
R010	SPDT	OCTAL	FIXED	1 MEGOHM	1.5 ma.	DE-ENERGIZED
R011	SPDT	OCTAL	FIXED	15K OHMS	2.0 ma.	DE-ENERGIZED
R012	DPDT	11-PIN	FIXED	1 MEGOHM	2.0 ma.	DE-ENERGIZED
R013	DPDT	11-PIN	FIXED	30K OHMS	2.0 ma.	DE-ENERGIZED
R014	SPDT	OCTAL	FIXED	1 MEGOHM	0.8 ma.	ENERGIZED
R015	SPDT	OCTAL	ADJUSTABLE	0-3 MEGOHMS	0.8 ma.	ENERGIZED
R016	DPDT	11-PIN	ADJUSTABLE	0-3 MEGOHMS	0.8 ma.	ENERGIZED

† *MODELS R011 AND R013 ARE MADE FOR APPLICATIONS WHERE HIGH SENSITIVITY IS NOT DESIRABLE, SUCH AS PROBE TO METAL CONTACT IN THE PRESENCE OF SLIGHTLY CONDUCTIVE CONDENSATE OR CONTAMINATES. SENSITIVITY OF MODELS R015 AND R016 CAN BE SET FOR OPERATION FROM A SHORT CIRCUIT ONLY, OR FROM ANY RESISTANCE VALUE UP 3 MEGOHMS.*

DIMENSIONS



WIRING DIAGRAMS



SKAN-A-MATIC
DIV.
FROST CONTROLS CORPORATION

2 JORDAN STREET, SKANEATELES, N.Y. 13152
(315) 685-3473

PRINTED IN U.S.A.

SKAN-A-MATIC DIVISION
FROST CONTROLS CORPORATION
2 JORDAN STREET, SKANEATELES, N.Y. 13152
(315) 685-3473

P - 6603

PRICE LIST

EFFECTIVE MAY 9, 1966

SMALL PLUG-IN PHOTOELECTRIC RELAYS

R11OA	$24.25
R11OB	24.25
R11OC	23.00
R11OD	23.00
R31OA	34.00
R31OB	36.75

LARGE PLUG-IN PHOTOELECTRIC RELAYS

R130A	47.00
R135A	52.00
R135B	52.00
R330A	48.00
R335A	53.00
R335B	53.00

SOLID STATE DRIVER PRINTED CIRCUIT CARDS

T100A	31.00
T100B	31.00
T105A	34.50
T105B	34.50
T105C	34.50
T300A	36.00
T300B	36.00
T300C	37.00
T305A	38.50
T305B	38.50

SOLID STATE DRIVER PLUG-IN MODULES

T110A	34.00
T110B	34.00
T115A	37.50
T115B	37.50
T115C	37.50
T310A	39.00
T310B	39.00
T310C	40.00
T315A	41.50
T315B	41.50
T315C	41.50

PHOTOELECTRIC COUNTERS

C140A	94.00
C340A	94.00

INDUSTRIAL TYPE PHOTOELECTRIC CONTROLS

R150A	$61.50
R150B	61.50
R155A	78.00
R155B	78.00
R155C	78.00
R156A	96.00
R350A	61.50
R350B	61.50
R355A	78.00
R355B	78.00
R355C	78.00
R356A	94.00

STANDARD SIZE RECEIVERS

P110	12.50
P150	14.00
P120	26.50
P130	17.50
P131	21.50
P140	21.50
P141	25.50

STANDARD SIZE LIGHT SOURCES

L110	8.50
L150	10.00
L120	22.50
L130	13.00
L131	17.00
L112	22.00
L140	16.50
L141	20.50

STANDARD SIZE SCANNER

S116	47.00

SUBMINIATURE REFLEX SCANNERS

S310	38.50
S311	40.50
S312	44.00
S313	46.50
S117	30.00
S118	32.50

SUBMINIATURE RECEIVERS

P310	$26.50
P311	29.00
P320	24.50
P321	27.00
P151	10.00
P152	12.50
P330	24.50
P331	27.00
P340	24.50
P341	27.00

SUBMINIATURE LIGHT SOURCES

L311	22.00
L321	15.00
L332	15.00
L341	13.50
L351	13.50
L361	13.50

SMALL PLUG-IN PILOT RELAYS

R010	23.00
R011	22.00
R012	25.50
R013	25.50
R014	32.50
R015	38.00

LIQUID LEVEL

R-051	56.00
R-052	64.00

ACCESSORIES & PARTS

146-103	1.80
146-817	4.50
R-F1	10.00
R-F4	14.00
R-P1	7.50
T-F8P	8.20
T-F0	4.50
#12 Lamp	.25

Quantity Discount Schedule

1 - 4	Net
5 - 9	5%
10 - 24	10%
25 - 49	15%

O.E.M.S. - Write for Discount Schedule.

Printed in the U.S.A.